

Math finance formula sheet 1

1.)

$$1 + q + q^2 + \dots + q^n = \frac{1 - q^{n+1}}{1 - q}$$

2.)

$$\frac{1}{r} [1 - (1 + r)^{-n}]$$

3.)

$$\left(1 + \frac{r}{m}\right)^{tm}$$

4.)

$$w = \frac{\Sigma^{-1}\mathbf{1}}{\mathbf{1}^T \Sigma^{-1} \mathbf{1}}$$

5.)

$$M = \begin{pmatrix} \mathbf{m}^T \Sigma^{-1} \mathbf{m} & \Sigma^T \Sigma^{-1} \mathbf{m} \\ \mathbf{1}^T \Sigma^{-1} \mathbf{m} & \mathbf{1}^T \Sigma^{-1} \mathbf{1} \end{pmatrix}$$

6.)

$$w = \frac{\Sigma^{-1}(\mathbf{m} - r\mathbf{1})}{\mathbf{1}^T \Sigma^{-1}(\mathbf{m} - r\mathbf{1})}$$

7.)

$$\begin{pmatrix} \lambda_1 \\ \lambda_2 \end{pmatrix} = M^{-1} \begin{pmatrix} \mu \\ 1 \end{pmatrix}; \quad w_\mu = \frac{\lambda_1}{2} \Sigma^{-1} \mathbf{m} + \frac{\lambda_2}{2} \Sigma^{-1} \mathbf{1}$$

8.)

$$\mu = r + \frac{\mu_{mp} - r}{\sigma_{mp}} \sigma$$

9.)

$$s_0 = \frac{\sigma_2^2 - \rho_{12} \sigma_1 \sigma_2}{\sigma_1^2 + \sigma_2^2 - 2\rho_{12} \sigma_1 \sigma_2}$$

10.)

$$(a) \mu_0 = \frac{\mu_1 \sigma_2^2 + \mu_2 \sigma_1^2 - \rho_{12} \sigma_1 \sigma_2 (\mu_1 + \mu_2)}{\sigma_1^2 + \sigma_2^2 - 2\rho_{12} \sigma_1 \sigma_2}; \quad (b) \sigma_0 = \frac{\sigma_1^2 \sigma_2^2 - \rho_{12}^2 \sigma_1^2 \sigma_2^2}{\sigma_1^2 + \sigma_2^2 - 2\rho_{12} \sigma_1 \sigma_2}$$

11.) $\mu = \mu_0 \pm A^{-1} \sigma$

$$A^2 = \frac{\sigma_1^2 + \sigma_2^2 - 2\rho_{12} \sigma_1 \sigma_2}{(\mu_1 - \mu_2)^2}$$